



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : **Confirmation No. 2449**  
Akira TERAOKA : Docket No. 2000-0311A  
Serial No. 09/533,778 : Group Art Unit 2882  
Filed March 24, 2000 : Examiner Hoon K. Song

## X-RAY INSPECTION METHOD AND APPARATUS USED FOR THE SAME

**REQUEST FOR RECONSIDERATION AND  
WITHDRAWAL OF FINAL OFFICE ACTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the final Office Action of August 12, 2003, Applicant in the above-referenced U.S. patent application hereby requests reconsideration of the rejections contained in the Office Action and withdrawal of the final Office Action.

In the Office Action, the Examiner rejected claims 21-32 as being anticipated by Halliday et al., U.S. 5,388,136. As this patent had been previously applied, Applicant conducted an interview on October 22, 2003 to discuss the applicability of the patent to the claims of the present application. As reflected by the Interview Summary form, agreement was reached that the Halliday et al. reference does not teach the claimed invention of swinging the X-ray detecting device in translational motion and applying X-rays to a sample with the X-ray source while rotating the X-ray source about a straight line in synchronization with the swinging of the X-ray detecting device as required by independent claim 21 and as reflected by the structural limitations of independent claim 25. Accordingly, as agreement has been reached with respect to this point, withdrawal of the rejections based upon the Halliday et al. reference is respectfully submitted to be in order, and such withdrawal of the rejections, as well as the final Office Action, is requested.

RECEIVED

NOV 17 2003

TC 2800 MAIL ROOM

For the record, Applicant will restate their position with respect to the differences between the Halliday et al. reference and the claims of the present application.

There are fundamental differences in operation and structure between the cited patent to Halliday (US 5388136) and the limitations of claims 21 and 25.

Noting for example Fig. 10, the present invention places a sample 13 to be inspected on a stage 14. A planar section of the sample 13a to be inspected has a straight line S, serving as an axis, extending therein. An X-ray source 11 and an X-ray detecting device 12 are positioned and arranged so as to face each other with a sample between them. The X-ray detecting device is swung in translational motion about the straight line while maintaining an incidence plane 12a of the X-ray detecting device parallel to the section of the sample. X-rays are applied to the sample with the X-ray source while rotating the X-ray source about the straight line S in synchronization with the swinging of the X-ray detecting device. Thus, X-rays passing through the sample are detected with the X-ray detecting device.

A control means 17 is operable to control a rotating means 15 and a swinging means 16 for rotating and swinging the X-ray source 11 and X-ray detecting device 12, respectively. The results of detection are processed with an image processing means 18.

The result of taking, for example, a vertical section image along a BGA can be images such as shown by Figs. 5(a) and 5(b). Thus, the device can detect along a line of ball connections 1a, even if such line is not readily visible from the outside of the package, i.e. even if such line is an internal line.

The specification discusses the manner of the operation of the present invention with respect to Figs. 6-9. Noting for example Fig. 9, a point K that is not located in the plane of the section winds up having a relatively obscure image as a result of the method of the present invention. Accordingly, only the desired image results.

Claim 21 distinguishes over Halliday by at least the recitation of applying x-rays to the sample with the x-ray source while rotating the x-ray source about the straight line in synchronization with the swinging of the x-ray detecting device.

The Examiner cites Halliday as applying the x-rays to the sample while rotating the source in synchronization with the swinging of the detecting device. However, in Halliday, there is no disclosure whatsoever of applying x-rays while rotating the source, much less in synchronization with the swinging of the x-ray detecting device. Halliday clearly appears to be taking images from different angles, and not an image during rotation or swinging. Note Col. 3, lines 43-46. Also note lines 54-58, which suggest that Halliday does not contemplate some type of rotation or swinging.

Claim 25 recites a means for rotating the source.

The Examiner cites the radially movable slides. However, radially movable slides only move in a radial direction. They do not cause rotational movement.

The Examiner further argues that Halliday teaches synchronization between the swinging and the rotation. However, there is in fact no 'means for rotating said x-ray source ... in synchronization with said x-ray detecting device' provided in Halliday. There is no disclosure of any means to cause such rotation and swinging synchronization, nor any apparent reason to have any such means from Halliday's disclosure.

Col. 2, lines 60+, does discuss synchronization "between the sources and the detectors", which is controlled by the master computer. This part goes on to say that "such control is done by computerized radial mapping of the source/detector to generate an offset table." But there is no discussion of rotation or swinging, or that this is what is being synchronized.

In view of the above, it is respectfully submitted that all of the claims pending in the present application clearly distinguish over the Halliday et al. reference. Indication of such is respectfully requested.

In view of the agreed inapplicability of the Halliday et al. patent to the claims of the present application, the finality of the Office Action of August 12, 2003 must be withdrawn. Accordingly, should the Examiner discover any further prior art that might be applicable to the claims of the present application, any such further Office Action must be made non-final.

In any case, it is believed that the present application is now in condition for allowance, and such allowance is respectfully requested.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance, and the Examiner is requested to pass the case to issue. If the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact Applicant's undersigned representative.

Respectfully submitted,

Akira TERAOKA

By: 

Nils E. Pedersen  
Registration No. 33,145  
Attorney for Applicant

NEP/krg  
Washington, D.C. 20006-1021  
Telephone (202) 721-8200  
Facsimile (202) 721-8250  
November 12, 2003

THE COMMISSIONER IS AUTHORIZED  
TO CHARGE ANY DEFICIENCY IN THE  
FEES FOR THIS PAPER TO DEPOSIT  
ACCOUNT NO. 23-0975